## AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A machine-implemented method for creating a musical sound, the method comprising:

establishing a model of a string that rests in a fluid medium and has ~~creating a sound by simulating self-sustained vibration of a string having~~ a fixed end and a movable end~~,~~;

simulating a turbulence to excite the moveable end of the string from a rest position;

simulating ~~the string subject to~~ a force exerted by a stream of ~~a~~ the fluid medium flowing in a direction ~~that has a component~~ along a longitudinal axis of the string;

calculating a self-sustained vibration of the string in response to the turbulence and the force;

calculating a representation of a sound based on the self-sustained vibration; and

creating the musical sound by a sound generating device based on the representation~~relating an excursion in time of the movable end to the force and relating movement of the string in time to the excursion of the movable end to simulate the self-sustained vibration~~.

2. (Currently Amended) ~~A~~ The method according to claim 1, wherein:

the string is supported between two supports and is aligned at rest in a first direction between the two supports;

a first of the two supports allows movement in a second direction orthogonal to the first direction and a second of the two supports does not allow movement; and

the string is caused from rest to vibrate in a plane, which includes the first and second directions, by turbulence in the fluid flow causing the stream of fluid medium to exert a pressure on the string in the second direction.

3. (Currently Amended) The ~~A~~ method according to claim 2, wherein:

movement of the string out of alignment with the first direction causes the stream of fluid medium flowing in the first direction to exert the force on the string in the second direction.

4. (Currently Amended) The ~~A~~ method according to claim 1, wherein:

the string is supported between two supports aligned in a first direction,

a first of the two supports is rigid and a second of the two supports allows movement in a second direction orthogonal to the first direction; and

the string is caused to vibrate in a plane, which includes the first and second directions, by the stream of fluid medium flowing in a direction having a component in the second direction.

5. (Currently Amended) The ~~A~~ method according to claim 1, wherein:

the string is supported between two supports aligned in an x-direction;

a first of the two supports allows movement in a y-direction orthogonal to the x-direction and a second of the two supports does not allow movement;

the string comprises a plurality of discrete elements aligned at rest in the x-direction and spaced apart by a distance dx; and

the discrete elements are able to move in discrete steps of time dt in the y-direction only.

6. (Currently Amended) The ~~A~~ method according to claim 5, in which the string comprises a plurality of j discrete elements from j=0 at one end movably supported by the first support to j=x-1 at the opposite end immovably supported by the second support; wherein

j is an integer; and

the stream of fluid medium flows in the x-direction and exerts a pressure on the string between elements j=0 and j=1.

7. (Currently Amended) The ~~A~~ method according to claim 6, wherein the force $F_{PRES}[n, 0]$ at time n acting on the movably supported element j=0 due to the pressure on the string between the movably supported element j=0 and adjacent element j=1 is given by:

$$F_{PRES}[n, 0] = P * (y[n, 0] - y[n, 1]) / dx$$

in which:

P denotes the pressure exerted by the stream of fluid medium on the string between the movably supported element j=0 and adjacent element j=0;

y[n, 0] denotes the excursion of the movably supported element j=0 at time n; and

$y[n, 1]$ denotes the excursion of the adjacent element $j=1$ at time n.

8. (Currently Amended) The ~~A~~ method according to claim 6, wherein the force $F_{TURB}[n, 0]$ at time n acting on the movably supported element $j=0$ due to the _turbulence in the stream of fluid medium is given by:

$$F_{TURB}[n, 0] = C_{TURB} * N_{RND}[n]$$

in which:

$C_{TURB}$ denotes a turbulence coefficient; and

$N_{RND}[n]$ denotes a random signal.

9. (Currently Amended) The ~~A~~ method according to claim 8, wherein the random signal comprises a low pass filtered noise.

10. (Currently Amended) The ~~A~~ method according to claim 6, wherein the excursion $y[n+1, 0]$ of the movably supported element for the next sample due to the pressure on the string between the movably supported element $j=0$ and adjacent element $j=1$ is given by:

$$y[n+1, 0] = y[n, 0] + (F_{PRES}[n, 0] + F_{TURB}[n, 0])*dt^2 / M[0]$$

in which:

$y[n, 0]$ denotes the excursion of the movably supported element $j=0$ at time n; and

$F_{PRES}[n, 0]$ denotes the force at time n acting on the movably supported element $j=0$ due to the pressure on the string between the movably supported element $j=0$ and adjacent element $j=1$;

$F_{TURB}[n, 0]$ denotes the force at time n acting on the movably supported element $j=0$ due to the turbulence in the stream of fluid medium; and

$M[0]$ denotes the mass of the movably supported element $j=0$.

11. (Currently Amended) The ~~A~~ method according to claim 10, wherein the excursion y[n+1, 0] is limited.

12. (Currently Amended) The ~~A~~ method according to claim 6, wherein the stream of the fluid medium exerts a pressure on the string between each of the elements; and

wherein the force F[n, j] at time n acting on each discrete element from j=1 to j=x-2 due to the pressure P is given by:

F[n, j] = P[j] * (y[n, j] – y[n, j-1]) / dx + P[j] * (y[n, j] – y[n, j+1]) / dx.

13. (Currently Amended) The ~~A~~ method according to claim 12, wherein the pressure P decreases linearly or exponentially with increasing j.

14. (Currently Amended) The ~~A~~ method according to claim 5, wherein a wave equation is used to relate the movement of the string in time to the excursion of the movable end, the wave equation being an approximation of a continuous wave equation

$$M\frac{\partial^2 y}{\partial t^2} = T\frac{\partial^2 y}{\partial x^2} - S\frac{\partial^4 y}{\partial x^4} + L_T\frac{\partial^3 y}{\partial x^2 \partial t} - L_S\frac{\partial^5 y}{\partial x^4 \partial t} - L_V\frac{\partial y}{\partial t} + F(x,t)$$

in which:

F(x, t) denotes an external force at coordinate x on the string at time t;

M denotes mass per length;

S denotes stiffness of the string;

T denotes tension of the string;

Ls denotes a loss associated with the stiffness of the string;

Lt denotes a loss associated with the tension of the string; and

Lv denotes a loss associated with the turbulent flow of the fluid medium.

15. (Currently Amended) The ~~A~~ method according to claim 14, wherein the approximation of the continuous wave equation is the discrete recursion formula:

y[n+1, j] = (y[n, j-2]·c1 + y[n, j-1]·c2 + y[n, j]·c3 + y[n, j+1]·c2 +

y[n, j+2]·c1 + y[n-1, j-2]·c4 + y[n-1, j-1]·c5 + y[n-1, j]·c6 + y[n1, j+1]·c5 + y[n-1, j+2]·c4) / M[j] + 2y[n, j] + F[n, j]/M[j]

in which:

dx = 1;

dt = 1;

y[n, j] denotes the excursion of discrete element j in the y-direction at time n;

y[n+1, j] denotes the excursion of discrete element j in the y-direction at time n+1;

y[n, j+1] denotes the excursion of discrete element j+1 in the y-direction at time n;

M[j] denotes the mass of discrete element j;

F[n, j] denotes an additional external force acting on a discrete element j at time n; and

c1 to c6 are coefficients, which depend on the material parameters of the string and the surrounding media.

16. (Currently Amended) The ~~A~~method according to claim 15, wherein

c1 = -(S + Ls);

c2 = T + 4S + Lt +4Ls;

c3 = -(2T +6S + Lv + 2Lt + 6Ls);

c4 = Ls;

c5 = -(Lt + 4Ls); and

c6 = Lv +2Lt +6Ls.

17. (Currently Amended) The ~~A~~method according to claim 15, wherein the discrete recursion formula is solved for the elements adjacent the respective supports by providing a dummy element at opposite ends of the string so that the excursion y[n+1, -1] of a dummy element adjacent the movably supported element for the next sample is given by:

y[n+1, -1] = y[n+1, 0] - (y[n+1, 1] - y[n+1, 0])

and the excursion y[n+1, x] of a dummy element adjacent the immovably supported element for the next sample is given by:

$y[n+1, x] = -y[n+1, x-2]$.

18. (Cancelled)

19. (Currently Amended) A machine readable medium providing executable computer program instructions which when executed cause a data processing system to perform a method <u>for creating a musical sound,</u> the method comprising:

<u>establishing a model of a string that rests in a fluid medium and has</u>~~creating a sound by simulating self-sustained vibration of a string having~~ <u>a fixed end and</u> a movable end~~,~~<u>;</u>

<u>simulating a turbulence to excite the moveable end of the string from a rest position;</u>

<u>simulating</u>~~the string subject to~~ a force exerted by a stream of ~~a~~<u>the</u> fluid medium flowing in a direction ~~that has a component~~ along a longitudinal axis of the string;

<u>calculating a self-sustained vibration of the string in response to the turbulence and the force;</u>

<u>calculating a representation of a sound based on the self-sustained vibration;</u> and

<u>creating the musical sound by a sound generating device based on the representation</u>~~relating an excursion in time of the movable end to the force and relating movement of the string in time to the excursion of the movable end to simulate the self-sustained vibration~~.

20. (Previously Presented) The machine readable medium according to claim 19, wherein:

the string is supported between two supports and is aligned at rest in a first direction between the two supports;

a first of the two supports allows movement in a second direction orthogonal to the first direction and a second of the two supports does not allow movement; and

the string is caused from rest to vibrate in a plane, which includes the first and second directions, by turbulence in the fluid flow causing the stream of fluid medium to exert a pressure on the string in the second direction.

21. (Previously Presented) The machine readable medium according to claim 20, wherein:

movement of the string out of alignment with the first direction causes the stream of fluid medium flowing in the first direction to exert the force on the string in the second direction.

22. (Previously Presented) The machine readable medium according to claim 19, wherein:

the string is supported between two supports aligned in a first direction,

a first of the two supports is rigid and a second of the two supports allows movement in a second direction orthogonal to the first direction; and

the string is caused to vibrate in a plane, which includes the first and second directions, by the stream of fluid medium flowing in a direction having a component in the second direction.

23. (Previously Presented) The machine readable medium according to claim 19, wherein:

the string is supported between two supports aligned in an x-direction;

a first of the two supports allows movement in a y-direction orthogonal to the x-direction and a second of the two supports does not allow movement;

the string comprises a plurality of discrete elements aligned at rest in the x-direction and spaced apart by a distance dx; and

the discrete elements are able to move in discrete steps of time dt in the y-direction only.

24. (Previously Presented) The machine readable medium according to claim 23, in which the string comprises a plurality of j discrete elements from j=0 at one end movably supported by the first support to j=x-1 at the opposite end immovably supported by the second support; wherein

j is an integer; and

the stream of fluid medium flows in the x-direction and exerts a pressure on the string between elements j=0 and j=1.

25. (Previously Presented) The machine readable medium according to claim 24, wherein the force $F_{PRES}[n, 0]$ at time n acting on the movably supported element j=0 due to the pressure on the string between the movably supported element j=0 and adjacent element j=1 is given by:

$$F_{PRES}[n, 0] = P * (y[n, 0] - y[n, 1]) / dx$$

in which:

P denotes the pressure exerted by the stream of fluid medium on the string between the movably supported element j=0 and adjacent element j=0;

y[n, 0] denotes the excursion of the movably supported element j=0 at time n; and

y[n, 1] denotes the excursion of the adjacent element j=1 at time n.

26. (Previously Presented) The machine readable medium according to claim 24, wherein the force $F_{TURB}[n, 0]$ at time n acting on the movably supported element j=0 due to the turbulence in the stream of fluid medium is given by:

$$F_{TURB}[n, 0] = C_{TURB} * N_{RND}[n]$$

in which:

$C_{TURB}$ denotes a turbulence coefficient; and

$N_{RND}[n]$ denotes a random signal.

27. (Previously Presented) The machine readable medium according to claim 24, wherein the excursion y[n+1, 0] of the movably supported element for the next sample due to the pressure on the string between the movably supported element j=0 and adjacent element j=1 is given by:

$$y[n+1, 0] = y[n, 0] + (F_{PRES}[n, 0] + F_{TURB}[n, 0]) * dt^2 / M[0]$$

in which:

y[n, 0] denotes the excursion of the movably supported element j=0 at time n; and

$F_{PRES}[n, 0]$ denotes the force at time n acting on the movably supported element j=0 due to the pressure on the string between the movably supported element j=0 and adjacent element j=1;

$F_{TURB}[n, 0]$ denotes the force at time n acting on the movably supported element j=0 due to the turbulence in the stream of fluid medium; and

M[0] denotes the mass of the movably supported element j=0.

28. (Previously Presented) The machine readable medium according to claim 27, wherein the excursion y[n+1, 0] is limited.

29. (Previously Presented) The machine readable medium according to claim 24, wherein the stream of the fluid medium exerts a pressure on the string between each of the elements; and

wherein the force F[n, j] at time n acting on each discrete element from j=1 to j=x-2 due to the pressure P is given by:

F[n, j] = P[j] * (y[n, j] – y[n, j-1]) / dx + P[j] * (y[n, j] – y[n, j+1]) / dx.

30. (Previously Presented) The machine readable medium according to claim 29, wherein the pressure P decreases linearly or exponentially with increasing j.

31. (Previously Presented) The machine readable medium according to claim 23, wherein a wave equation is used to relate the movement of the string in time to the excursion of the movable end, the wave equation being an approximation of a continuous wave equation

$$M\frac{\partial^2 y}{\partial t^2} = T\frac{\partial^2 y}{\partial x^2} - S\frac{\partial^4 y}{\partial x^4} + L_T\frac{\partial^3 y}{\partial x^2 \partial t} - L_S\frac{\partial^5 y}{\partial x^4 \partial t} - L_V\frac{\partial y}{\partial t} + F(x,t)$$

in which:

F(x, t) denotes an external force at coordinate x on the string at time t;

M denotes mass per length;

S denotes stiffness of the string;

T denotes tension of the string;

Ls denotes a loss associated with the stiffness of the string;

Lt denotes a loss associated with the tension of the string; and

Lv denotes a loss associated with the turbulent flow of the fluid medium.

32. (Previously Presented) The machine readable medium according to claim 31, wherein the

approximation of the continuous wave equation is the discrete recursion formula:

$$y[n+1, j] = (y[n, j-2]\cdot c1 + y[n, j-1]\cdot c2 + y[n, j]\cdot c3 + y[n, j+1]\cdot c2 + y[n, j+2]\cdot c1 + y[n-1, j-2]\cdot c4 + y[n-1, j-1]\cdot c5 + y[n-1, j]\cdot c6 + y[n1, j+1]\cdot c5 + y[n-1, j+2]\cdot c4) / M[j] + 2y[n, j] + F[n, j]/M[j]$$

in which:

$dx = 1$;

$dt = 1$;

$y[n, j]$ denotes the excursion of discrete element j in the y-direction at time n;

$y[n+1, j]$ denotes the excursion of discrete element j in the y-direction at time n+1;

$y[n, j+1]$ denotes the excursion of discrete element j+1 in the y-direction at time n;

$M[j]$ denotes the mass of discrete element j;

$F[n, j]$ denotes an additional external force acting on a discrete element j at time n; and

c1 to c6 are coefficients, which depend on the material parameters of the string and the surrounding media.

33. (Previously Presented) The machine readable medium according to claim 32, wherein

$c1 = -(S + Ls)$;

$c2 = T + 4S + Lt + 4Ls$;

$c3 = -(2T + 6S + Lv + 2Lt + 6Ls)$;

$c4 = Ls$;

$c5 = -(Lt + 4Ls)$; and

$c6 = Lv + 2Lt + 6Ls$.

34. (Previously Presented) The machine readable medium according to claim 32, wherein the discrete recursion formula is solved for the elements adjacent the respective supports by providing a dummy element at opposite ends of the string so that the excursion $y[n+1, -1]$ of a dummy element adjacent the movably supported element for the next sample is given by:

$$y[n+1, -1] = y[n+1, 0] - (y[n+1, 1] - y[n+1, 0])$$

and the excursion y[n+1, x] of a dummy element adjacent the immovably supported element for the next sample is given by:

$$y[n+1, x] = -y[n+1, x-2].$$

35. (Cancelled)

36. (Currently Amended) An apparatus comprising:

a processing element to establish a model of a string that rests in a fluid medium and has~~simulate self-sustained vibration of a string having~~ a fixed end and a movable end, to simulate a turbulence to excite the moveable end of the string from a rest position, to simulate ~~the string subject to~~ a force exerted by a stream of ~~a~~ the fluid medium flowing in a direction ~~that has a component~~ along a longitudinal axis of the string, the processing element further to calculate a self-sustained vibration of the string in response to the turbulence and the force, and to calculate a representation of a sound based on the self-sustained vibration~~relate an excursion in time of the movable end to the force and to relate movement of the string in time to the excursion of the movable end to simulate the self-sustained vibration~~;

a sound generating element, coupled to the processing element, to create a musical sound based on the representation~~self-sustained vibration of the string~~; and

a storage device, coupled to the processing element, to store data used ~~in simulation of the self-sustained vibration~~by the processing elements.

37. (Currently Amended) ~~An~~ The apparatus according to claim 36, wherein:

the string is supported between two supports and is aligned at rest in a first direction between the two supports;

a first of the two supports allows movement in a second direction orthogonal to the first direction and a second of the two supports does not allow movement; and

the string is caused from rest to vibrate in a plane, which includes the first and second directions, by turbulence in the fluid flow causing the stream of fluid medium to exert a pressure on the string in the second direction.

38. (Currently Amended) ~~An~~ The apparatus according to claim 37, wherein:

movement of the string out of alignment with the first direction causes the stream of fluid medium flowing in the first direction to exert the force on the string in the second direction.

39. (Currently Amended) The ~~An~~ apparatus according to claim 36, wherein:

the string is supported between two supports aligned in a first direction,

a first of the two supports is rigid and a second of the two supports allows movement in a second direction orthogonal to the first direction; and

the string is caused to vibrate in a plane, which includes the first and second directions, by the stream of fluid medium flowing in a direction having a component in the second direction.

40. (Currently Amended) The ~~An~~ apparatus according to claim 36, wherein:

the string is supported between two supports aligned in an x-direction;

a first of the two supports allows movement in a y-direction orthogonal to the x-direction and a second of the two supports does not allow movement;

the string comprises a plurality of discrete elements aligned at rest in the x-direction and spaced apart by a distance dx; and

the discrete elements are able to move in discrete steps of time dt in the y-direction only.

41. (Currently Amended) The ~~An~~ apparatus according to claim 40, in which the string comprises a plurality of j discrete elements from j=0 at one end movably supported by the first support to j=x-1 at the opposite end immovably supported by the second support; wherein

j is an integer; and

the stream of fluid medium flows in the x-direction and exerts a pressure on the string between elements j=0 and j=1.

42. (Currently Amended) The ~~An~~ apparatus according to claim 41, wherein the force $F_{PRES-}$ [n, 0] at time n acting on the movably supported element j=0 due to the pressure on the string between the movably supported element j=0 and adjacent element j=1 is given by:

$F_{PRES}[n, 0] = P * (y[n, 0] - y[n, 1]) / dx$

in which:

P denotes the pressure exerted by the stream of fluid medium on the string between the movably supported element j=0 and adjacent element j=0;

y[n, 0] denotes the excursion of the movably supported element j=0 at time n; and

y[n, 1] denotes the excursion of the adjacent element j=1 at time n.

43. (Currently Amended) The ~~An~~ apparatus according to claim 41, wherein the force $F_{TURB}[n, 0]$ at time n acting on the movably supported element j=0 due to the turbulence in the stream of fluid medium is given by:

$$F_{TURB}[n, 0] = C_{TURB} * N_{RND}[n]$$

in which:

$C_{TURB}$ denotes a turbulence coefficient; and

$N_{RND}[n]$ denotes a random signal.

44. (Cancelled).

45. (Currently Amended) The ~~An~~ apparatus according to claim 41, wherein the excursion y[n+1, 0] of the movably supported element for the next sample due to the pressure on the string between the movably supported element j=0 and adjacent element j=1 is given by:

$$y[n+1, 0] = y[n, 0] + (F_{PRES}[n, 0] + F_{TURB}[n, 0]) * dt^2 / M[0]$$

in which:

y[n, 0] denotes the excursion of the movably supported element j=0 at time n; and

$F_{PRES}[n, 0]$ denotes the force at time n acting on the movably supported element j=0 due to the pressure on the string between the movably supported element j=0 and adjacent element j=1;

$F_{TURB}[n, 0]$ denotes the force at time n acting on the movably supported element j=0 due to the turbulence in the stream of fluid medium; and

$M[0]$ denotes the mass of the movably supported element j=0.